

## **Engineering Analysis**

*CDM MAX LLC*

North Beach Gas Treating & Processing Facility  
13880 Brooklyn Road [Conecuh Co. Rd. No. 42]  
Evergreen, AL 36401  
Conecuh Co., AL

Facility No. 103-0029

### **Project Summary:**

On 10 September 2009, CDM MAX, LLC was issued Synthetic Minor Operating Permit Nos. 103-0029-X001, X002, and X003 for a new 3 MMScf/Day gas processing and treatment facility, to be located at the above address, which is about 4 miles north of Brooklyn, Conecuh Co., AL. This facility primarily treats gas from Sklar Exploration Wells [Facility Nos. 103-0021, 103-0026, and 502-0090].

On 28 April 2010, CDM MAX, LLC submitted a permit application to alter the original process to include a Tri-Ethylene Glycol Dehydration Unit [TEG Unit]. This unit is required since the facility is encountering problems with water in the piping freezing upstream of the existing glycol dehydration unit. This freezing obstructs the flow in the piping and is the result of the thermodynamics of the gas, water, and hydrocarbon liquid system. Thus, the addition of this unit is intended to eliminate, or reduce, these freezing problems.

On 6 May 2010, the permit application was deemed to be complete.

### **Process Description:**

Feed to the plant would consist of sour, wet field gas that has been separated from much of the entrained moisture and heavier hydrocarbons at each of the primary production sites in the area. These individual sour, wet gas streams would be gathered and combined at the entrance to the facility, and passed through a low pressure separator to remove free water and liquid hydrocarbons.

Gas exiting the low pressure separator would be sent to the Inlet Compressor and the pressure is increased to desired operational pressure. The compressor is driven by a 750 BHP inlet compressor engine.

A high pressure separator is used to remove remaining water and liquid hydrocarbons from the sour, wet gas prior to processing. The water and hydrocarbon liquids are stored on site until sale, custody transfer, or disposal.

It is estimated that the inlet gas to the facility would be 1-3.5 ppm H<sub>2</sub>S. The high pressure gas would then be sent to a sweetening unit filled with SulfaTreat<sup>®</sup> pellets. SulfaTreat<sup>®</sup> is the brand name of an absorbent used to remove Total Reduced Sulfur, including H<sub>2</sub>S, and Carbon Monoxide, from a sour gas stream. The product of this vessel would be a wet, sweet gas stream; the SulfaTreat<sup>®</sup> pellets would have to be replaced periodically.

The wet, sour high pressure gas stream is then sent to the TEG Unit where it is contacted with a lean Tri-Ethylene Glycol stream. The Lean TEG stream absorbs water out of the gas stream to form a rich TEG stream. The rich TEG stream is passed through a flash tank to remove gaseous compounds, and then a reboiler. In the reboiler, the rich TEG stream is heated to vaporize entrained liquids, thus resulting in a lean TEG stream, and a water vapor/hydrocarbon stream. Fuel for the reboiler would consist primarily of the gaseous compounds from the flash tank. The lean TEG would be recycled back to the process. The water vapor/hydrocarbon stream would be passed through a condenser to remove water and heavier hydrocarbons. Remaining gaseous components would be vented to atmosphere. The condensed hydrocarbon liquids and water would be sent to storage until sale or custody transfer.

The sweet, semi-dry gas would then be injected with ethylene glycol before being sent through the refrigeration plant. General cooling for the refrigeration plant would be provided by a 750 BHP refrigeration compressor utilizing propane as the refrigerant. In the refrigeration plant, the gas is cooled such that heavier hydrocarbons, primarily propane and higher, are condensed out in liquid form, called Natural Gas Liquids [NGLs]. The NGLs would be separated from the rich ethylene glycol and water mixture using a high pressure separator. The NGLs are stored onsite in pressurized bullet tanks until sale. The remaining gas would then be sent to the pipeline, or to the fuel gas system.

The rich ethylene glycol and water mixture would contain some Volatile Organic Compounds (VOCs). The rich ethylene glycol and water mixture would be heated in the glycol reboiler where the entrained water and VOCs would be removed as vapors and vented to atmosphere, while the lean glycol stream is recycled back for injection in the gas stream prior to entrance into the refrigeration plant.

#### Regulations:

There are several possible regulations that could apply to the proposed new TEG Unit:

1. **ADEM Administrative Code** Rule 335-3-4-.01(1) states that no person shall emit to the atmosphere an opacity of greater than twenty percent (20%) over a six (6) minute period. The new reboiler and vent would be subject to this regulation. However, because the fuel for the TEG Unit reboiler would be primarily natural gas, the no opacity is expected from

this unit. Therefore, no specific monitoring is required for this regulation for this unit.

2. **ADEM Administrative Code** Rule 335-3-5-.03(1-2) covers sulfur emissions for petroleum production. Hydrogen Sulfide may not be emitted in a greater quantity than 0.10 grain per standard cubic foot (scf) unless it is properly burned to maintain a ground concentration of less than 20 ppb beyond property limits, as averaged over a 30 minute period. The new TEG reboiler would be subject to this regulation. However, due to the relatively low SO<sub>2</sub> emission values, as shown in Table 13 of the Calculations section, monitoring for H<sub>2</sub>S would consist of monitoring gas H<sub>2</sub>S content and fuel usage.
3. **ADEM Administrative Code** Rule 335-3-11-.06(33) refers to NESHAPS Subpart HH. Subpart HH contains both major source and area source requirements for Oil and Gas Production Facilities. This regulation applies to Oil and Gas Production Facilities that either: 1. produce, upgrade, or store liquid hydrocarbons prior to custody transfer or 2. produce, upgrade, or store natural gas prior to custody transfer. The following definitions from §63.761 will be used:
  - a. A Major Source is the same as that defined in §63.2 except that HAPs emissions at an oil and gas production or exploration site may not be aggregated for any associated equipment other than glycol dehydrators and storage vessels with the potential for flash emissions.
  - b. A Major Source in §63.2 is defined as a site in which the potential to emit is greater than, or equal to, 10 Ton/yr for a single HAP or greater than, or equal to, 25 Ton/yr for all HAPs.
  - c. Associated equipment means all equipment from the wellhead to the point of custody transfer except glycol dehydrators and storage vessels with the potential for flash emissions.
  - d. An Area Source is defined as any non-Major Source.

Based on the Hazardous Air Pollutant [HAPs] emissions in Table 13, the proposed plant would not be a major source of HAPs. The Area Source requirements of this regulation only apply to Tri-ethylene Glycol Dehydrators. The new TEG Unit would be subject to this regulation per §63.760(a).

The stringency of the regulation and the compliance date are determined by the proximity of the facility to dense population centers, denoted Urban-1 counties, as defined in §63.761. Conecuh County is considered an Urban-2 County, as defined in §63.761. Per §63.760(f)(6), the TEG Unit is to be in compliance with the regulation by the date of start-up. Requirements are specified in §63.764(d), with exemptions as allowed by §63.764(e). These exemptions are allowed if the facility has a design capacity of less than 85,000 Scm/Day [~3 MMScf/Day], or TEG reboiler vent emissions less than 0.9 Mg/yr [~1 Ton/yr]. Facilities claiming these

exemptions are required to demonstrate their exemption status using procedures specified in §63.772(b). CDM MAX, LLC has requested to be exempt based on the benzene criteria. Based on the total BTEX emissions shown in Table 11, CDM MAX, LLC should easily be able to meet the exemption limit.

No Air Toxics review is warranted due to the relatively low amount of HAPs emissions.

4. **ADEM Administrative Code** Rule 335-3-14-.04 refers to the Prevention of Significant Deterioration (PSD) regulation.

Unit	Potential Emissions (Ton/yr)					HAPs (Formaldehyde + Total HAPs)
	PM	SO <sub>2</sub>	NO <sub>x</sub>	CO	VOC	
Flare	0.00E+00	1.27E+00	7.65E+00	4.16E+01	4.86E+01	0.00E+00
Glycol Reboilers	2.93E-02	2.31E-03	3.85E-01	3.24E-01	2.12E-02	0.00E+00
Glycol Reboiler Vents	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.97E+00	6.08E-01
Engines	1.49E+00	3.04E-02	2.90E+01	5.79E+01	1.45E+01	1.06E+00
<b>Total:</b>	<b>1.52E+00</b>	<b>1.30E+00</b>	<b>3.70E+01</b>	<b>9.99E+01</b>	<b>6.91E+01</b>	<b>1.67E+00</b>

Table 13: Total Potential Emissions for CDM MAX Gas Facility

Upon examination of Table 13 above (copied from Part E of the Calculations Section, the total facility emissions should be less than the PSD threshold of 250 Ton/yr. Furthermore, eventually the flare should be used as an emergency device only. Therefore, this project is not subject to a PSD review. Additionally, emissions from this project should not significantly impact any Class I area.

5. **ADEM Administrative Code**, Rule 335-3-10-.02(63) refers to Subpart KKK of the NSPS. This Subpart has requirements for all equipment at an onshore natural gas processing plants in wet gas service, located at natural gas processing facilities constructed, reconstructed, or modified after 20 January 1984.

Per §60.633(d), non-fractionating gas plants with a design capacity of 10 MMScf/Day are exempt from the periodic monitoring requirements for pumps in light liquid service, valves in gas/vapor and light liquid service, and pressure relief devices in gas/vapor service. A non-fractionating plant is defined as a gas plant that does not separate NGLs into natural gas products. The North Beach Gas Facility meets the definition of a non-fractionating plant, and is designed to process 3 MMScf/Day. All equipment [valves, flanges, connectors, etc.] surrounding the TEG Unit would be subject to this regulation.

6. **Title V Requirements:** CDM MAX has applied for a Synthetic Minor Operating Permit. From Table 13 above, the facility emissions should be less than 100 Ton/yr for all criteria pollutants, although the CO emissions are projected at 99.9 Ton/yr. Since 99.9 Ton/yr is exceedingly close to

the Title V threshold of 100 Ton/yr, CDM MAX would be subject to a strict monitoring plan, as contained in the existing permit. In addition, CDM MAX would be required to run a GRI-GLYCalc simulation quarterly to estimate the VOC and HAPs emissions from the TEG reboiler vent, or to directly measure these emissions using methods and procedures specified in §63.772(b). As an alternative, CDM MAX may elect to substitute a worst-case scenario for each quarter for which a GRI-GLYCalc simulation is run. Subsequent testing should be done at the frequency specified in Subpart HH.

Equipment subject to NSPS KKK would be subject to the control equipment, monitoring, recordkeeping, and reporting specified in that regulation.

Required Reports:

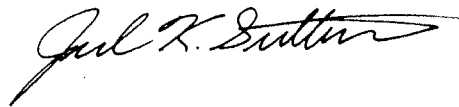
CDM will be required to submit quarterly reports. These reports are to summarize the emissions from each unit in both lb/hr and Ton/yr, along with any deviations from permit requirements.

Proposed Permit:

SMOP 103-0029-X004 is the proposed permit. This permit is a re-issuance of SMOP X003, except that it now incorporates requirements for 40 CFR 63 Subpart HH. With the issuance of permit X004, permit X003 would become void.

Recommendations:

This analysis indicates that these sources would meet the requirements of all federal and state rules and regulations. Therefore, I recommend that CDM MAX, LLC, be issued Synthetic Minor Operating Permit Nos. 103-0029-X004 for these units upon receipt of permitting fees. Draft copies of the permit may be found in Attachment B.



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Joel K. Sutton  
Industrial Minerals Section  
Energy Branch  
Air Division

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6 May 2010  
Date



*Attachment A:*

*Calculations*

NOTE: All calculations included for completeness.



### Part A-Glycol Reboiler Calculations:

Table 1 shows the AP-42 factors for potential emissions from a natural gas-fired combustion source. In this case, these values apply to the glycol reboilers.

Pollutant	SO <sub>2</sub>	NO <sub>x</sub>	CO	PM	VOC
AP-42 Factor (lb/MMscf)	0.6	100	84	7.6	5.5

Table 1: AP-42 Emission Factors in lb/MMscf

These factors were used by CDM MAX in their potential emissions computations. Equation 1 was used to generate the results in Table 2:

$$\text{Amount Pollutant} = \frac{(\text{AP - 42 Factor (in lb/MMscf)}) * (\text{Rated Heat Capacity (in MMBTU/hr)})}{(\text{Heat Content (in MMBTU/MMscf)})} \quad [\text{Equation 1}]$$

Here, the amount of pollutant is in lb/hr. The AP-42 Factors are listed in Table 1 and the Rated Heat Capacity for the reboiler is listed in the table under Heater Rating. The reboilers burn sweetened gas produced at the plant, and with a Heat Content of 1080 BTU/Scf.

Plant Reboiler	Reboiler Rating (MMBTU/hr)	Pollutant (lb/hr)				
		PM	SO <sub>2</sub>	NO <sub>x</sub>	CO	VOC
Ethylene Glycol	0.6	4.22E-03	3.33E-04	5.56E-02	4.67E-02	3.06E-03
TEG	0.35	2.46E-03	1.94E-04	3.24E-02	2.72E-02	1.78E-03
<b>Total Pollutants (lb/hr):</b>		<b>6.69E-03</b>	<b>5.28E-04</b>	<b>8.80E-02</b>	<b>7.39E-02</b>	<b>4.84E-03</b>

Table 2: Potential Emissions of Criteria Pollutants for the Reboilers in lb/hr

Multiplying the results in Table 2 by 8760 hr/yr and dividing by 2000 lb/Ton yields Table 3.

Plant Reboiler	Reboiler Rating (MMBTU/hr)	Pollutant (Ton/yr)				
		PM	SO <sub>2</sub>	NO <sub>x</sub>	CO	VOC
Glycol Reboiler	0.6	1.85E-02	1.46E-03	2.43E-01	2.04E-01	1.34E-02
TEG	0.35	1.08E-02	8.52E-04	1.42E-01	1.19E-01	7.81E-03
<b>Total Pollutants (Ton/yr):</b>		<b>2.93E-02</b>	<b>2.31E-03</b>	<b>3.85E-01</b>	<b>3.24E-01</b>	<b>2.12E-02</b>

Table 3: Potential Emissions of Criteria Pollutants for the Reboilers in Ton/yr



### Part B-Flare Calculations:

These calculations will be based on a gas flowrate of 411,000 scf/day or 17,125 scf/hr. These calculations are based on the assumption that all of the gas entering the plant gas will be flared. Assuming that all of the gas is sent to the flare, then 17,125 scf/hr of gas would be burned in the flare. There are 1000 scf/Mscf, which converts to a flowrate of 17.125 Mscf/hr.

For a Flare, the amount of CO and NO<sub>x</sub> produced is shown in Equation II:

$$\text{Amount Pollutant} = \frac{(\text{AP - 42 Factor (in lb/MMBTU)}) * (\text{Rated Heat Capacity (in BTU/hr)})}{(1000000 \text{ BTU/MMBTU})}$$

[Equation II]

The AP-42 Factors for flares from Table 13.5-1 of the Industrial Flares Section are 0.37 lb/MMBTU for CO and 0.068 lb/MMBTU for NO<sub>x</sub>. The Rated Heat Capacity for the Flare may be computed by multiplying the flowrate (in scf/hr), which is 17,125 scf/hr, by the gas Heat Content as shown in Equation III:

$$\text{Rated Heat Capacity (in BTU/hr)} = (\text{Heat Content (in BTU/scf)}) * (\text{Flowrate (in scf/hr)})$$

[Equation III]

Table 6 shows the results for CO and NO<sub>x</sub> if the entire gas stream is burned in the flare. Results are shown in both lb/hr and ton/52 week year. The Heat Content listed for the flare is the average inlet Heat Content.

Unit	Heat Content (BTU/scf)	Pollutant (lb/hr)		Pollutant (Ton/yr)	
		CO	NO <sub>x</sub>	CO	NO <sub>x</sub>
Flare	1500	9.50E+00	1.75E+00	4.16E+01	7.65E+00
Total Pollutants:		9.50E+00	1.75E+00	4.16E+01	7.65E+00

Table 4: Potential Emissions for CO and NO<sub>x</sub>

Equation IV may be used to compute the amount of SO<sub>2</sub> released through the flare.

$$\text{Amount SO}_2 = (1.689 \text{ lb/Mscf}) * (\text{Mole \% H}_2\text{S}) * (\text{Flowrate (in Mscf/hr)})$$

[Equation IV]

As mentioned earlier, the flowrate to the flare would be 17.125 Mscf/hr. The mole percent for the flare is the average inlet content, and is equal to approximately 100 ppm [0.01 mole %]. The Heat Content is the value given earlier. Table 5 shows the amount of potential SO<sub>2</sub> emissions.

Unit	Mcf/hr	H <sub>2</sub> S mole %	SO <sub>2</sub> (lb/hr)	SO <sub>2</sub> (Ton/yr)
Flare	17.1250	0.0100	2.89E-01	1.27E+00
<b>Total Pollutant:</b>			<b>2.89E-01</b>	<b>1.27E+00</b>

Table 5: Potential SO<sub>2</sub> Emissions

Now, in order to estimate the potential VOC emissions, the following assumptions were made:

- the gas molecular weight = 28 lb/lbmol
- the VOC mass fraction = 0.44
- the flare is 98% efficient
- the flowrate to the flare = 17,125 scf/hr

The potential VOC emissions are:

$$\text{VOC Emissions} = \left( \frac{17125 \text{ scf/hr} * 28 \text{ lb/lbmol}}{380 \text{ scf/lbmol}} \right) * 0.48 * (1 - 0.98)$$

$$\text{VOC Emissions} = 11.1 \text{ lb/hr}$$

$$\text{VOC Emissions} = 48.6 \text{ Ton/yr}$$

Table 6 is a composite of Tables 4 and 5 and the calculation shown above for VOC. It shows the total potential emissions for the criteria pollutants in Ton/year for the flare.

Unit	Pollutant (Ton/yr)			
	SO <sub>2</sub>	NO <sub>x</sub>	CO	VOC
Flare	1.27E+00	7.65E+00	4.16E+01	4.86E+01
<b>Total:</b>	<b>1.27E+00</b>	<b>7.65E+00</b>	<b>4.16E+01</b>	<b>4.86E+01</b>

Table 6: Potential Emissions for Criteria Pollutants for the Flare

The results of Table 6 will be added to the results of Table 3 as well as the results of the following calculations in order to obtain an overall value.

### Part C-Engine Calculations:

There are to be two types of engines at the plant site: inlet compressor engines and refrigeration compressor engines. Table 7 summarizes the onsite engines. All engines are four stroke lean burn (4SLB) engines. Equation V was used to convert horsepower to MMBTU/hr as shown in Table 7. The Conversion Factors are based on manufacturer data.

$$\text{Engine Rating (in MMBTU/hr)} = \frac{\text{Engine Rating (in BHP)}}{1000000 \text{ BTU/MMBTU}} * \text{Conversion Factor (in BTU/BHP - hr)}$$

[Equation V]

Engine Rating (BHP)	Conversion Factor (BTU/BHP-hr)	Engine Rating (MMBTU/hr)	Catalytic Converter
750	7866	5.90E+00	No

Table 7: Engine Summary

For the purposes of these calculations, AP-42 values will be used for Formaldehyde, Particulates (PM), and an SO<sub>2</sub> estimate. These values come from Table 3.2-3 for the 4SRB, as reported in the Natural Gas Fired Engines Section and are in units of lb/MMBTU. The prescribed emission limits from 40 CFR 60 Subpart JJJJ will be used for NO<sub>x</sub>, CO, and VOCs. These values are listed in units of g/hp-hr in the regulation, but have been converted to lb/hp-hr here. Table 8 shows emission factors used in these calculations.

NSPS JJJJ Factor by Pollutant (lb/BHP-hr)			AP-42 Factor by Pollutant (lb/MMBTU)		
NO <sub>x</sub>	CO	VOC	PM	SO <sub>2</sub>	Formaldehyde
0.00441	0.00882	0.002205	0.02891	0.000588	0.0205

Table 8: AP-42 Factors for the Engines

The Rated Heat Capacity (Engine Rating in MMBTU/hr), as shown in Table 7, along with the AP-42 Factors, as shown in Table 8, will be used with Equation I from Part A to compute the values in Table 9 for Particulates, Formaldehyde, and an SO<sub>2</sub> estimate. The NSPS JJJJ limit values will be used to compute the other potential emissions as shown in Table 9. In order to obtain these emissions, the engine rating in BHP will be multiplied by the emission factor in lb/BHP-hr.

Engine Rating (BHP)	Potential Emissions (lb/hr)					
	PM	SO <sub>2</sub>	NO <sub>x</sub>	CO	VOC	Formaldehyde
750	1.71E-01	3.47E-03	3.31E+00	6.62E+00	1.65E+00	1.21E-01
Total:	3.41E-01	6.94E-03	6.62E+00	1.32E+01	3.31E+00	2.42E-01

Table 9: Potential Emissions for Criteria Pollutants for the Engines in lb/hr

Multiplying the results in Table 9 by 8760 hr/yr and dividing by 2000 lb/Ton yields the results in Table 10:

Engine Rating (BHP)	Potential Emissions (Ton/yr)					
	PM	SO <sub>2</sub>	NO <sub>x</sub>	CO	VOC	Formaldehyde
750	7.47E-01	1.52E-02	1.45E+01	2.90E+01	7.24E+00	5.30E-01
<b>Total:</b>	<b>1.49E+00</b>	<b>3.04E-02</b>	<b>2.90E+01</b>	<b>5.79E+01</b>	<b>1.45E+01</b>	<b>1.06E+00</b>

*Table 10: Potential Emissions for Criteria Pollutants in Ton/yr*

These results will be added to those for the reboilers, the flare, and the following calculations in order to obtain an overall value for the potential emissions for this facility.

Part D: Glycol Dehydrator Calculations

Table 11 summarizes the values from the glycol dehydrator simulations for the proposed plant. These emissions include VOCs, as well as Benzene, Toluene, and Xylene [BTEX], and Total HAPs.

<b>Pollutant</b>	<b>Ethylene Glycol Unit</b>		<b>TEG Unit</b>		<b>Total</b>	
	<b>lb/hr</b>	<b>Ton/yr</b>	<b>lb/hr</b>	<b>Ton/yr</b>	<b>lb/hr</b>	<b>Ton/yr</b>
VOC	0.18	<b>0.79</b>	1.18	<b>5.18</b>	1.36	<b>5.97</b>
BTEX	0.03	<b>0.12</b>	0.09	<b>0.39</b>	0.12	<b>0.50</b>
Total HAPs	0.03	<b>0.12</b>	0.11	<b>0.49</b>	0.14	<b>0.61</b>

*Table 11: Glycol Dehydrator Emissions*

The Total emissions in Ton/yr for VOC and Total HAPs will be added to all preceding emissions in order to obtain an overall value for the facility.



Part E-Total Emissions:

Table 12 summarizes the facility-wide emissions on a unit basis in lb/hr:

Unit	Potential Emissions (lb/hr)					
	PM	SO <sub>2</sub>	NO <sub>x</sub>	CO	VOC	HAPs (Formaldehyde + Total HAPs)
Flare	0.00E+00	2.89E-01	1.75E+00	9.50E+00	1.11E+01	0.00E+00
Glycol Reboilers	6.69E-03	5.28E-04	5.28E-04	7.39E-02	4.84E-03	0.00E+00
Glycol Reboiler Vents	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.36E+00	1.39E-01
Engines	3.41E-01	6.94E-03	6.62E+00	1.32E+01	3.31E+00	2.42E-01
<b>Total:</b>	<b>3.48E-01</b>	<b>2.97E-01</b>	<b>8.36E+00</b>	<b>2.28E+01</b>	<b>1.58E+01</b>	<b>3.81E-01</b>

*Table 12: Facility-wide Potential Emissions in lb/hr*

Table 13 summarizes the facility-wide emissions on a unit basis in Ton/yr:

Unit	Potential Emissions (Ton/yr)					
	PM	SO <sub>2</sub>	NO <sub>x</sub>	CO	VOC	HAPs (Formaldehyde + Total HAPs)
Flare	0.00E+00	1.27E+00	7.65E+00	4.16E+01	4.86E+01	0.00E+00
Glycol Reboilers	2.93E-02	2.31E-03	3.85E-01	3.24E-01	2.12E-02	0.00E+00
Glycol Reboiler Vents	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.97E+00	6.08E-01
Engines	1.49E+00	3.04E-02	2.90E+01	5.79E+01	1.45E+01	1.06E+00
<b>Total:</b>	<b>1.52E+00</b>	<b>1.30E+00</b>	<b>3.70E+01</b>	<b>9.99E+01</b>	<b>6.91E+01</b>	<b>1.67E+00</b>

*Table 13: Facility-wide Potential Emissions in Ton/yr*

This result is referenced in Point No. 4 of the Regulations Section.



*Attachment B:*

*Draft Provisos*



# SYNTHETIC MINOR OPERATING PERMIT

**PERMITEE:** CDM MAX, LLC

**LOCATION:** 13880 Brooklyn Road [County Rd. 42], Evergreen, Conecuh Co., AL

**PERMIT NUMBER**

103-0029-X004

**DESCRIPTION OF EQUIPMENT,  
ARTICLE OR DEVICE**

North Beach Gas Treating & Processing Facility

Compressors in VOC service

Pumps, pressure relief devices, open-ended valves or lines,  
valves, flanges or other connectors in VOC or wet gas service

Two (2) - Glycol dehydrator still vents

*In accordance with and subject to the provisions of the Alabama Air Pollution Control Act of 1971, as amended, Code of Alabama 1975, §§22-28-1 to 22-28-23 (the "AAPCA") and the Alabama Environmental Management Act, as amended, Code of Alabama 1975, §§22-22A-1 to 22-22A-15, and rules and regulations adopted thereunder, and subject further to the conditions set forth in this permit, the Permittee is hereby authorized to construct, install and/or use the equipment, device or other article described above.*

ISSUANCE DATE : **DRAFT**

Alabama Department of Environmental Management



**CDM MAX, LLC — North Beach Gas T & P Facility: NSPS KKK & MACT HH**

**Permit No. : 103-0029-X004**

1. This permit is issued on the basis of Rules and Regulations existing on the date of issuance. In the event additional Rules and Regulations are adopted, it shall be the permit holder's responsibility to comply with such rules.
2. This permit expires and the application is cancelled if construction has not begun within 24 months of the date of issuance of the permit.
3. This permit is not transferable. Upon sale or legal transfer, the new owner or operator must apply for a permit within 30 days.
4. The issuance of this permit does not convey any property rights of any sort, or any exclusive privilege.
5. The permittee shall not use as a defense in an enforcement action that maintaining compliance with conditions of this permit would have required halting or reducing the permitted activity.
6. Additions and revisions to the conditions of this Permit will be made, if necessary, to ensure that the Department's air pollution control rules and regulations are not violated.
7. Nothing in this permit or conditions thereto shall negate any authority granted to the Department pursuant to the Alabama Environmental Management Act or regulations issued thereunder.
8. A new permit application must be made for new sources, replacements, alterations or design changes which may result in the issuance of, or an increase in the issuance of, air contaminants, or the use of which may eliminate or reduce or control the issuance of air contaminants.
9. On completion of construction of the device for which this permit is issued, notification of the fact is to be given to the Chief of the Air Division. Authorization to operate the unit must be received from the Chief of the Air Division. Failure to notify the Chief of the Air Division of construction and/or operation without authorization could result in revocation of this permit.
10. This process including all air pollution control devices and capture systems for which this permit is issued shall be maintained and operated at all times in a manner so as to minimize the emissions of air contaminants. Procedures for ensuring that the above equipment is properly operated and maintained so as to minimize the emission of air contaminants shall be established.
11. In case of shutdown of air pollution control equipment for scheduled maintenance for a period greater than **24 hours**, the intent to shut down shall be reported to the Air Division at least 24 hours prior to the planned shutdown, **unless accompanied by the immediate shutdown of the emission source.**

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12. In the event there is a breakdown of equipment in such a manner as to cause increased emission of air contaminants for a period greater than 24 hours, the person responsible for such equipment shall notify the Department within an additional 24 hours and provide a statement giving all pertinent facts, including the duration of the breakdown. The Department shall be notified when the breakdown has been corrected.
13. All deviations from requirements within this permit shall be reported to the Department within 48 hours of the deviation or by the next work day while providing a statement with regards to the date, time, duration, cause and corrective actions taken to bring the sources back into compliance. A review and evaluation of this report shall be utilized in Departmental determination of whether or not a violation of a permit requirement or requirements occurred.
14. This permit is issued with the condition that, should obnoxious odors arising from the plant operations be verified by Air Division inspectors, measures to abate the odorous emissions shall be taken upon a determination by the Alabama Department of Environmental Management that these measures are technically and economically feasible.
15. Records will be maintained of the occurrence and duration of any startup, shutdown, or malfunction in the operation of the process equipment and any malfunction of the air pollution control equipment. These records will be kept in a permanent form suitable for inspection and will be retained for at least two years following the date of each occurrence.
16. Submittal of other reports regarding monitoring records, fuel analyses, operating rates, and equipment malfunctions may be required as authorized in the Department's air pollution control rules and regulations. The Department may require stack emission testing at any time.
17. Except as provided for in section §60.630(d) of 40 CFR Part 60, Subpart KKK and section §60.482-1(d) of 40 CFR Part 60, Subpart VV, each affected facility (as defined in provisions 17(a) through (c) of this permit) that is located within an onshore natural gas processing facility in which construction, reconstruction or modification commenced after January 20, 1984 shall comply with the requirements specified in 40 CFR Part 60, Subpart KKK as is summarized in the provisions 17(a) through 17(e) of this permit.
  - (a) Affected facility is defined as:
    - (1) Each compressor
    - (2) Each group of equipment (as defined in provision 17(a)(2)(i) through (vi) of this permit) that is located within a process unit.
      - (i) Each valve

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- (ii) Each pump
- (iii) Each pressure relief device
- (iv) Each sampling connection system
- (v) Each open-ended valve or line
- (vi) Each flange or other connector

And

- (3) That is in VOC or wet gas service (as defined in section §60.481 of 40 CFR Part 60, Subpart VV and section §60.631 of 40 CFR Part 60, Subpart KKK).
- (b) Except as provided for in section §60.484 of 40 CFR Part 60, Subpart VV, each affected facility shall comply with the requirements specified in provisions 12(b)(1) through (9) of this permit.
- (1) Except as provided for in section §60.633(f) of 40 CFR Part 60, Subpart KKK, each compressor shall meet the requirements specified in sections §60.482-3, §60.482-9 and §60.482-10 of 40 CFR Part 60, Subpart VV.
  - (2) Except as provided for in section §60.633(d) and (e) of 40 CFR Part 60, Subpart KKK, each valve shall meet the requirements specified in sections §60.482-7, §60.482-8, and §60.482-9 of 40 CFR Part 60, Subpart VV and either section §60.483-1 or §60.483-2 of 40 CFR Part 60, Subpart VV.
  - (3) Except as provided for in section §60.633(d) and (e) of 40 CFR Part 60, Subpart KKK, each pump shall meet the requirements specified in sections §60.482-2, §60.482-8, §60.482-9 and §60.482-10 of 40 CFR Part 60, Subpart VV.
  - (4) Except as provided for in section §60.633(b), (d) and (e) of 40 CFR Part 60, Subpart KKK, each pressure relief device shall meet the requirements specified in sections §60.482-4, §60.482-8, §60.482-9 and §60.482-10 of 40 CFR Part 60, Subpart VV.
  - (5) Except as provided for in section §60.633(c) of 40 CFR Part 60, Subpart KKK, each sampling connection system shall meet the requirements specified in sections §60.482-5, §60.482-9 and §60.482-10 of 40 CFR Part 60, Subpart VV.

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- (6) Each open-ended valves and lines shall meet the requirements specified in sections §60.482-6 and §60.482-9 of 40 CFR Part 60, Subpart VV.
  - (7) Each flange or other connector shall meet the requirements specified in sections §60.482-8 and §60.482-9 of 40 CFR Part 60, Subpart VV.
  - (8) Provided a closed vent system and control device is utilized to meet any of the above requirements, each closed vent system and control device shall meet the requirements specified in sections §60.482-9 and §60.482-10 of 40 CFR Part 60, Subpart VV.
  - (9) Provided a flare is utilized to meet any of the above requirements, the flare shall comply with the requirements specified in §60.18 of 40 CFR Part 60, Subpart A.
- (c) Except as provided for in section §60.633 (c), (d), (e) and (f) of 40 CFR Part 60, Subpart KKK, compliance with the standards specified in provision 12(b) of the permit shall be demonstrated through the utilization of the tests methods and procedures specified in section §60.485 of 40 CFR Part 60, Subpart VV.
  - (d) The inspection and monitoring requirements specified in sections §60.482-1 through §60.482-10 of 40 CFR Part 60, Subpart VV and either section §60.483-1 or §60.483-2 of 40 CFR Part 60, Subpart VV shall be complied with.
  - (e) Except as provided for in section §60.633, §60.635 and §60.636 of 40 CFR Part 60, Subpart KKK, the recordkeeping and reporting requirements specified in section §60.7 and §60.19 of 40 CFR Part 60, Subpart A, sections §60.486 and §60.487 of 40 CFR Part 60, Subpart VV shall be maintained and submitted to the Department.
  - (f) Provided the requirements specified in proviso 17(b)(1) through (9) of this permit were not complied with, a deviation from the requirements specified in proviso 17(b)(1) through (9) of this permit shall be deemed to have occurred.
18. Fugitive equipment VOC emissions shall be estimated while utilizing the method and procedures specified in either proviso 18(a) or 18(b) or 18(c) or 18(d) of this permit.
- (a) While utilizing the methods and procedures specified in Section 2.3.1 (Average Emission Factor Approach) of Chapter 2 in EPA's "Protocol for Equipment Leak Emission Estimates EPA-453/R-95-017, Nov 1995" document.
  - (b) While utilizing the methods and procedures specified in Section 2.3.2 (Screening Ranges Approach) of Chapter 2 in EPA's "Protocol for Equipment Leak Emission Estimates EPA-453/R-95-017, Nov 1995" document.

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- (c) While utilizing the methods and procedures specified in Section 2.3.3 (Correlation Approach) of Chapter 2 in EPA's "Protocol for Equipment Leak Emission Estimates EPA-453/R-95-017, Nov 1995" document.
- (d) While utilizing the methods and procedures specified in Section 2.3.4 (Unit Specific Correlation Approach) of Chapter 2 in EPA's "Protocol for Equipment Leak Emission Estimates EPA-453/R-95-017, Nov 1995" document.
- (e) Total Plant Fugitive VOC (Tons/Month) =  
$$\sum \text{of all Equipment Type Categories for all process units} / 2000 \text{ Lbs/Ton}$$
- (f) The monthly plant fugitive VOC emissions may be calculated for the initial month and that value may be utilized for successive months.
- (g) Records for the information specified in proviso 18(a) through (f) shall be maintained and made available for inspection.

19. The requirements specified in proviso 19(a) through (e) shall be complied with.

- (a) Within three (3) months of this issuance of this permit and every three months thereafter, the inlet gas stream to the glycol dehydrator shall be analyzed for its C<sub>1</sub> to C<sub>6</sub>, normal hexane, benzene, toluene, ethyl benzene and total xylene and BTU content.
- (b) A monthly record shall be maintained of the glycol dehydrator process parameter readings that are required as input data for the GRI-GLYCalc computer simulation model.
- (c) Glycol dehydrator/reboiler vent emissions shall be calculated quarterly using one of the following methods:
  - (1) Utilizing the latest content analysis that is required by proviso 19(a) of this permit and the average values of the data recorded in accordance to the requirements specified in proviso 19(b) of this permit in conjunction with the GRI-GLYCalc computer simulation model.  
$$\text{Glycol VOC (Tons/Quarter)} = \frac{[\text{Glycol VOC (Lbs/Quarter)}]}{[1 \text{ Ton}/2000 \text{ Lbs.}]}$$
  
$$\text{Glycol HAP (Tons/Quarter)} = \frac{[\text{Glycol HAP (Lbs/Quarter)}]}{[1 \text{ Ton}/2000 \text{ Lbs.}]}$$
  - (2) Calculating a worst-case scenario at least annually, and applying these results to each quarter.
- (d) Records for the information specified in proviso 19(a) through (c) shall be maintained and made available for inspection.

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- (e) The frequency of this record and/or calculation may be modified upon receipt of Department approval.
- 20. At no time shall the total emissions from the sources at this facility exceed 100 Ton/yr of NO<sub>x</sub>, CO, VOC, or SO<sub>2</sub>. Compliance with this provision will be demonstrated by maintaining emission calculations as detailed in all current permits.
- 21. CDM Max, LLC, shall submit quarterly monitoring reports on a calendar basis.
  - (a) These reports shall be submitted within 30 days following the end of the calendar quarter.
  - (b) These reports shall summarize the information in provisos 18(e) and 19(c) of this permit.
  - (c) Reported emissions shall cover a 12-month period.
  - (d) The frequency and/or content of the report may be altered upon receipt of Departmental approval.
- 22. Provided a glycol dehydrator is utilizing Tri-Ethylene Glycol [TEG], that unit is subject to area source requirements of 40 CFR 63 Subpart HH, and shall comply with the following requirements [§63.760(a)]
  - (a) The unit shall be in compliance upon start-up [§63.760(f)(6)]
  - (b) The unit shall meet one of the following emission limits:
    - (1) The actual average uncontrolled Benzene emissions from the vent shall be maintained at less than 0.9 Megagrams per year [§63.764(e)(1)(ii)]
    - OR
    - (2) The actual average flowrate of natural gas to the unit is less than 85,000 Scm/Day, as demonstrated by a continuous flow meter [§63.764(e)(i)]
  - (c) Compliance with proviso 22(b) shall be with methods and procedures laid out in proviso 19 for either directly measuring flowrates, or Benzene emissions from the reboiler vent. [§63.772(a) & (b)]
  - (d) Other methods and procedures allowed by Subpart HH may be selected instead of provisos 22(b) and (c), provided notification is submitted to the Department.

**DRAFT**

\_\_\_\_\_  
Date